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A Review on Analysis of a Tall Structure with Shear Panel and Floating Columns

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ABSTRACT

For effective design and good construction practises of multistory buildings, numerous prior studies have been conducted. When an earthquake strikes a palace, seismic stresses are produced at the building's floor level. A variety of structure damage was seen after the earthquake. This study was conducted in seismic zone IV. In this work, we examine how tall structures with and without floating columns behave seismically. There are various situations in multistory buildings when it may be difficult to place a column in a certain spot.

This study compares two multistory buildings, one of which supports its columns directly from the ground, and the other of which has floating columns in various locations. We prepared the model for the same height, the same plan, and the same loading condition for this analysis using the Staad Pro software. We are using an 11-story building with a 33.8-meter overall height and a layout that measures 18.92 by 19.78 metres for our analysis. There are 50 columns in the building, and 12 of them are supported by ground floor beams rather than the ground.

These columns are termed as floating columns. We are providing a shear panels in those locations where the columns are supported. This shear wall transfers the load (coming from the floating columns) to the wall supporting columns. By considering these conditions we analysis both structures and find out the results of using floating columns in the same building. In this analysis to comparison of behavior of tall buildings using with and without floating column is concluded on parameters maximum beam moment, maximum beam shear and maximum nodal deflection and volume of concrete and volume of steel . By considering these conditions we analysis both structures and find out the results of using floating columns in the same building.

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KEYWORDS: *Floating Column, Shear Pannels, Staad.Pro, Bending Moment, Shear Force, Seismic Zone-IV*

1. INTRODUCTION

- Many urban multistory buildings in India today have open first storey as an unavoidable feature. This is primarily being adopted to accommodate parking or reception lobbies in the first storey. In present scenario buildings with floating columnis a typical feature in the modern multistory construction in urban India. Such features are highly undesirable in building built in seismically active areas. This studyhighlights the importance of explicitly recognizing the presence of the floating column in the analysis of building. Alternate measures, involving stiffness balance of the firststorey and the storey above, are proposed to reduce the irregularity introduced by thefloating columns.
- Floating column rest on the beam means the beam which support the column is act as a foundation. That beam is called as transfer beam. This is widely used in high storied buildings which are used for both commercial and residential purpose. This helps toalter the plan of the top floors to our convenience. The transfer beam that support floating column will be designed with more reinforcement.
- The total seismic base shear as experienced by a

building during an earthquake is dependent on its natural period; the seismic force distribution is dependent on the distribution of stiffness and mass along the height. The behavior of a building during earthquakes depends critically on its overall shape, size and geometry, in addition to how the earthquake forces are carried to the ground.

- Buildings with columns that hang or float on beams at an intermediate storey and donot go all the way to the foundation, have discontinuities in the load transfer path.
- In structural engineering, a shear wall is a structural system composed of braced panels(also known as shear panels) to counter the effects of lateral load acting on a structureFEM codes are developed for 2D multi storey frames with and without floating column to study the responses of the structure under different earthquake excitation having different frequency content keeping the PGA and time duration factor constant.The time history of floor displacement, inter storey drift, base shear, overturningmoment are computed for both the frames with and without floating column.
- The behavior of a building during earthquakes depends critically on its overall shape, size and geometry, in addition to how the earthquake forces are carried to the ground.The earthquake forces developed at different floor levels in a building need to be brought down along the height to the ground by the shortest path; any deviation or discontinuity in this load transfer path results in poor performance of the building. Buildings with vertical setbacks (like the hotel buildings with a few storey wider than the rest) cause a sudden jump in earthquake forces at the level of discontinuity. Buildings that have fewer columns or walls in a particular storey or with unusually tall storey tend to damage or collapse which is initiated in that storey. Many buildings withan open ground storey intended for parking collapsed or were severely damaged in Gujarat during the 2001 Bhuj earthquake. Buildings with columns that hang or float onbeams at an intermediate storey and do not go all the way to the foundation, have discontinuities in the load transfer path.

Tall Structure

- Tall buildings throughout the world are becoming popular day by day. With the advent of modern day construction technology and computers, the basic aim has been to construct safer buildings keeping in view the overall economics of the project. A high-rise building, apartment tower, office tower, apartment block, or block of flats, is a tall building or structure used as a residential and or office use. In some areas they may be referred to as "Multi Dwelling Unit" or “Vertical cities”. They have the potential to decongest the urban sprawl on the ground level, and increase the urban density, housing higher number of families in lesser space
- Massachusetts, United States General Laws define a high-rise as being higher than 70 feet (21 m).
- Most building engineers, inspectors, architects and similar professions define a high-rise as a building that is at least 75 feet (23 m) tall.

What is floating column

A column is supposed to be a vertical member starting from foundation level and transferring the load to the ground. The term floating column is also a vertical element which (due to architectural design/ site situation) at its lower level (termination Level) rests on a beam which is a horizontal member. The beams in turn transfer the load to other columns below it.

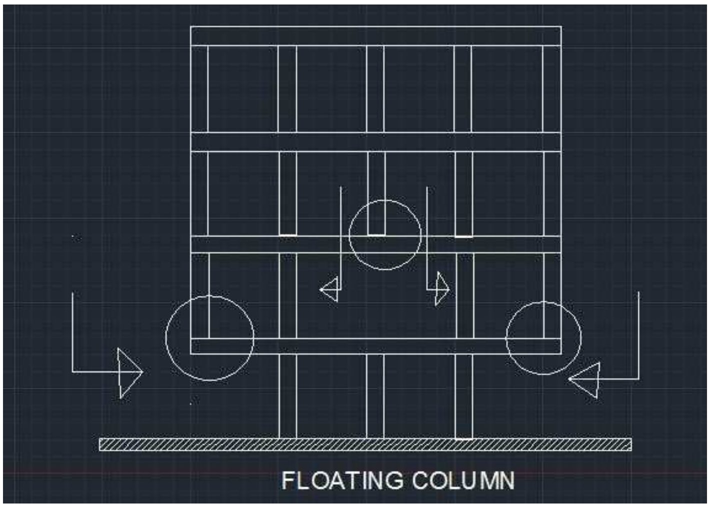


Fig 1.1.floating column

There are many projects in which floating columns are adopted, especially above the ground floor, where transfer girders are employed, so that more open space is available in the ground floor. These open spaces may be required for assembly hall or parking purpose. The transfer girders have to be designed and detailed properly, especially in earth quake zones. The column is a concentrated load on the beam which supports it. As far as analysis is concerned, the column is often assumed pinned at the base and is therefore taken as a point load on the transfer beam. STAAD Pro, ETABS and SAP2000 can be used to do the analysis of this type of structure. Looking ahead, of course, one will continue to make buildings interesting rather than monotonous. However, this need not be done at the cost of poor behaviorand earthquake safety of buildings. Architectural features that are detrimental to earthquake response of buildings should be avoided. If not, they must be minimized.When irregular features are included in buildings, a considerably higher level of engineering effort is required in the structural design and yet the building may not be as good as one with simple architectural features. Hence, the structures already made with these kinds of discontinuous members are endangered in seismic regions.But those structures cannot be demolished, rather study can be done to strengthen the structure or some remedial features can be suggested. The columns of the first storey can be made stronger, the stiffness of these columns can be increased by retrofitting or these may be provided with bracing to decrease the lateral deformation.

Fig.1.2. Example of floating column building

SHEAR WALL IN RCC BUILDING

Shear wall is defined as vertical structural member who can resist a combination of moment, shear and axial load induced by gravity load and lateral load transfer to the wall from other structural member. RCC walls including shear walls are the usual multi-Storied Buildings requirements. Coinciding centroid and mass centre of the building during design is the ideal for a Structure. An introduction to shear wall represents a most efficient solution to stiffen a structural system of building as the main function of a shear wall is to increase the lateral load resistance. Cross-sections of Shear walls can be used are rectangular shapes to more irregular cores such as channel, T, L, barbell shape, box etc. The use of shear wall structure is gaining popularity day by day in high rise building, especially in the construction of service apartment or office/ commercial tower. It has been proved, that shear wall system is efficient structural system for multi storied building in the range of 30-35 storeys.

Shear Walls are uniquely composed structural walls incorporated in the buildings to restrict horizontal forces that are convey in the plane of the wall due to wind, earthquake and distinctive forces. They are fundamentally flexural members and normally gave in high rise structures to avoid the total fall of the tall structure under the seismic forces. Walls can be designed as plain concrete walls when there is only compression with no tension in the section. else, they should be composed as reinforced concrete walls. The value of the Shear Walls in the confining of structures has sometimes been recognized. At the point when arranged in favorable places of structures, they give an sufficient power to oppose horizontal force resisting system, while at the same time satisfying other functional requirements. For structures up to 20 stories the utilization of shear walls is a decisions matter. For structure is more than 30 stories, shear walls may become basic from view point of economy and avoid of lateral deflection, Because a vast part of side long force on the structure and the lateral shear force usually from it is often assigned to such structural walls is known as “Shear Walls”. Shear walls are behaves like vertical oriented wide beams that convey earthquake forces downwards to the establishment. That is the reason, it is always suitable to reliable them in structure built in regions likely to earthquake of high amount of intensity or large winds.

Shear walls are provided to resist horizontal earthquake forces and to increase the rigidity of building. When shear wall has enough strength, it will transfer the horizontal forces to the next element in load path below. These elements in the load path may be another shear walls,slabs, floors, foundation walls, or footings. The stiffness of shear wall will prevent floor and roof framing members from moving off their supports. Also, buildings that are sufficiently stiff, usually suffer less non-structural damage.

Reinforced concrete (RC) buildings usually have vertical plate-like RC walls known as Shear Walls (Figure2) additionally to slabs, beams and columns. These walls typically begin atfoundation level and square measure continuous throughout the building height. Theirthickness will be as low as 150mm, or as high as 400mm in high rise buildings. The overwhelming success of buildings with shear walls in resisting robust earthquakes issummarised within the quote: “We cannot afford to make concrete buildings meant to resistsevere earthquakes while not shear walls.” Mark Fintel, a noted consulting engineer in USA. RC shear walls give massive strength and stiffness to buildings within the direction of their orientation, which significantly reduces lateral sway of the building and thereby reduces harm to structure and its contents. Since shear walls carry massive horizontal earthquake forces, the overturning effects on them area unit massive. Shear walls in buildings should be symmetrically located in decide to cut back ill-effects of twist in buildings. They may be placed symmetrically on one or each directions in arrange. Shear walls area unit more effective.

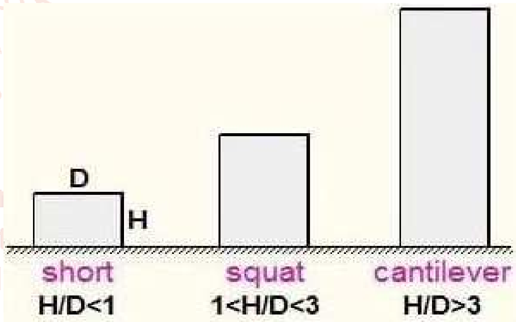
Shear walls should give the mandatory lateral strength to resist horizontal earthquake forces. Once shear walls square measure strong enough, they'll transfer these horizontal forces to future part within the load path below them. These alternative components within the load path are also other shear walls, floors, foundation walls, slabs or footings. Shear walls additionally give lateral stiffness to prevent the roof or floor on top of from excessive side- sway. Once shear walls square measure stiff enough, they'll stop floor and roof framing members from moving off their supports. Also, buildings that are sufficiently stiff can sometimes suffer less non-functional damage.

ADVANTAGES OF SHEAR WALLS IN RC BUILDINGS

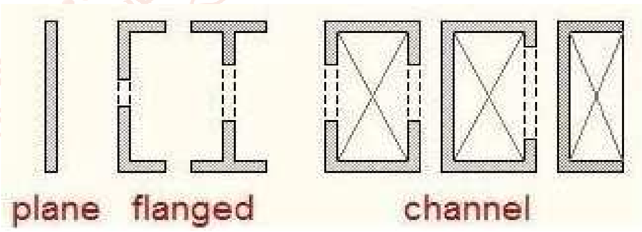
Properly designed and detailed buildings with shear walls have shown very good performance in past earthquakes. The overwhelming success of buildings with shear walls in resisting strong earthquakes is summarized in the quote: “we cannot afford to build concrete buildings meant to resist severe earthquakes without shear walls.” Mark fintel, a notedconsulting engineer in a shear walls in high seismic regions requires special detailing. However, in past earthquakes, even buildings with sufficient amount of walls that were not specially detailed for seismic performance (but had enough well-distributed reinforcement) were saved from collapse. Shear wall buildings are a popular choice in many earthquake prone countries, like Chile, New Zealand and USA. Shear walls are easy to construct, because reinforcement detailing of walls is relatively straight-forward and therefore easily implemented at site. Shear walls are efficient, both in terms of construction cost and effectiveness in minimizing earthquake damage in structural and non-structural elements (like glass windows and building contents).

STRUCTURAL FORMS OR TYPES OF SHEAR WALLS

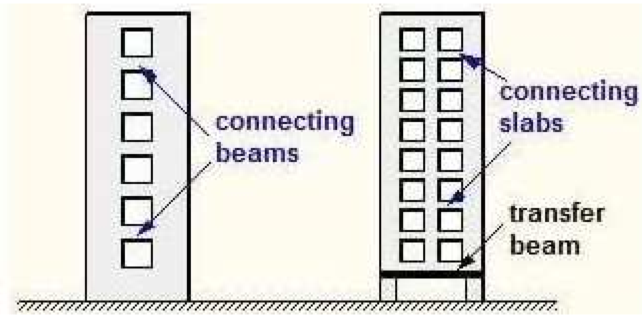
Monolithic shear walls are classified as short, squat or cantilever according to their height todepth ratio.



Generally shear walls are either plane or flanged in section, while core walls consists of channel sections.



In many cases, the wall is pierced by openings. These are called coupled shear walls because they behave as individual continuous wall sections coupled by the connecting beams or slabs.

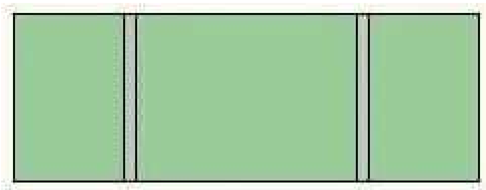


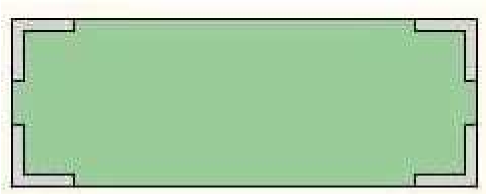
Normally the walls are connected directly to the foundations. However, in a few cases where the lateral loads are relatively small and there no appreciable

dynamic effects, then they can be supported on columns connected by a transfer beam to provide clear space.

LOCATION OF SHEAR WALLS IN A BUILDING

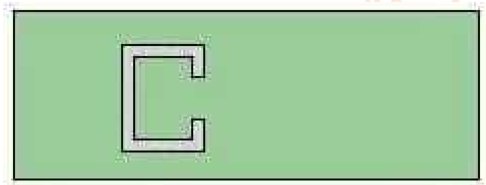
The shape and plan position of the shear wall influences the behavior of the structure considerably. Structurally, the best position for the shear walls is in the centre of each half of the building. This is rarely practical, however, since it dictates the utilization of the space, so they are positioned at the ends.





This shape and position of the walls give good flexural stiffness in the short direction, but relies on the stiffness of the frame in the other direction.

This arrangement provides good flexural stiffness in both directions, but may cause problems from restraint or shrinkage. As does this arrangement with a single core, but which does not have the problem from restraint of shrinkage.



However, this arrangement lacks the good torsional stiffness of the previous arrangements due to the eccentricity of the core.

If the core remains in this position then it must be designed explicitly for the torsion. Itis far preferable to adopt a symmetrical arrangement to avoid this.

FUNCTIONS OF SHEAR WALL

The main functions of a Shear Wall can be described as follows:

1. **Providing Lateral Strength to building**: Shear Wall must provide lateral shear strength to the building to resist the horizontal earthquake forces, wind forces and transfer these forces to the foundation.
2. **Providing Lateral Stiffness to building:** Shear Walls provide large stiffness to building in the direction of their orientation, which reduces lateral sway of the building and thus reduces damage to structure.

FINITE ELEMENT METHOD

The finite element method was originally employed for structural analysis only. It wasfirst introduced by Turner in 1956. The finite element method, as it is in general applied to the solution of the Euler/Navier-Stokes equations, starts with a subdivision of the physical space into triangular (in 2-D) or into tetrahedral (in 3-D) elements. Thus, an unstructured grid has to be generated. Depending on the element type and the required accuracy, a certain number of points at the boundaries and/or inside an element is specified, where the solution of the flow problem has to be found.The total number of points multiplied with the number of unknowns determines the number of *degrees of freedom.* Furthermore, the so-called *shape functions* have to be defined, which represent the variation of the solution inside an element. In practical implementations, linear elements are usually employed, which use the grid nodes exclusively. The shape functions are then linear distributions, whose value is zero outside the corresponding element. This results in a second-order accurate representation of the solution on smooth grids.

RESPONSE-SPECTRUM ANALYSIS

Response-spectrum analysis (RSA) is a linear-dynamic statistical analysis method which measures the contribution from each natural mode of vibration to indicate the likely maximum seismic response of an essentially elastic structure. Response- spectrum analysis provides insight into dynamic behavior by measuring pseudo- spectral acceleration, velocity, or displacement as a function of structural period for a given time history and level of damping. It is practical to envelope response spectra such that a smooth curve represents the peak response for each realization of structural period.

Response-spectrum analysis is useful for design decision-making because it relates structural type-selection to dynamic performance. Structures of shorter period experience greater acceleration, whereas those of longer period experience greater displacement. Structural performance objectives should be taken into account during preliminary design and response-spectrum analysis.

STAAD-PRO V8I

STAAD pro is the leading design and structural analysis software developed in YorbaLinda, CA by Research Engineers International. In the late months of year 2005, Research Engineers was brought by Bentley Systems.

It is quite user friendly and supports a number of steel, timber and concrete design codes. It can make utilization of different manifestations of structural analysis from the conventional first order static analysis, second order p-delta investigation and geometrical non-linear analysis. These models can be used in different forms of dynamic analysis from model extraction and response spectrum to time history analysis.

STAAD.pro provides a very interactive user interface that allows users to draw frame sections and input load values and dimensions. According to specified specifications, it analyzes the structure and finally designs the members with reinforcement details for the RCC frame.

Versions of STAAD-pro

- An older version called STAAD-III for windows is used by Iowa State University foreducational purposes for structural and civil engineers.
- Latest version: STAAD pro V8i series 5.

SEISMIC BEHAVIOUR OF BUILDINGS IN INDIA

According to the Indian seismic code, there is nothing but a soft structure, but the lateral hardness of the building is less than 50% [IS: 1893, 1997]. Generally, the construction of high rise buildings is based on total seismic base shear experienced during earthquake from its natural time. Earthquake force distributed at the base is equivalent to building mass at its Height. In a soft-storied building, the upper storey isgetting stiff; the small inter-storey passes through the drift. However, the interstate flow in soft first floor is big. The strength of the column is also large at the first floor for high rise buildings, because the first floor shear is maximum as compared to above floors. For upper level floors, however, due to the presence of less mass of building, the strength of the pillar effectively decreases, which occurs with sudden hardness in uneven side force distribution, which can cause stress concentration locally. It has adverse effects on the performance of buildings during land shaking. Such buildings should be analyzed with dynamic analysis and carefully designed. Many earthquakes in the past, for example, Sun Fernando 1971, Northbridge 1994, Kobe 1995, have demonstrated potential dangers associated with such buildings. In the walls of the filler, there was only minor damage in the upper stove cracks. The buildings of Ajanta Apartments have a set a nearly four-storey RC frame building, which are located all together. In each of these buildings, except for the first floor, there are two apartments in each building, there are two apartments in the upper floors, but there is only one apartment on the first floor. On the other hand, open space means parking, and therefore there is no wall panel filled in it. Whereas, only minor damage to the building was reported to the first floor with two apartments, the first floor pillar in the open space in the second building was badly damaged.

In north and north eastern areas of India there are large scale hilly areas, which are classified under seismic zone IV and V. The construction of the RCC multi-storey building on hilly slopes is a popular demand, due to its economic growth and increasing urbanization. This increase in construction activity is adding an increase in population density. During construction, it should be noted that the hilly areas are different from the plains, which are very uneven in horizontal and vertical planes, andare coupled with torsion. In India, Himalaya is a large arch of mountains, which defines the northern Indian subcontinent. It was created by the on-going tectonic collision of Indian and Eurasian plates, where according to the Indian census of 2011, there is a housing density of around 62159.2 square kilometres. Therefore, there is a need to study the seismic safety and design of these high rise structures on the slopes.

Dynamic attributes of mountain buildings are quite different from the rest buildings on flat topography, because they are regular, irregular and symmetrical, both in vertical and horizontal directions, without odd ones. Rigidity and irregular variationof the mass in vertical and horizontal directions is in the form of a large scale centre and the centre of the wick of one stone does not interact with each other and does not occur on the vertical line for different floor levels. Under lateral loads, these buildings are usually subjected to significant tensional reaction. Apart from this, due to site conditions, hill sloping buildings are seen as uneven column heights within one storey, resulting in huge variations in the hardness of the columns of the same building. On the upper side, the hardest columns are attracted to very large number of lateral forces and they are likely to suffer more damage as compared to others.

Seismic Zones in India

Continuing different geology in different places of our country clearly shows that the possibility of large earthquakes occurring at different places is different. Thus, a seismic zoning map was necessary to identify these areas. Depending on the level of continuous intensity during the previous major earthquakes, the map of the each region was decided. In 1970, India was divided into five regions, which was later modified from 2002 to 4 areas, which is in area II, III, IV and I area map was merged with II area under sector zone 2 under Seismic Area I of 1970.

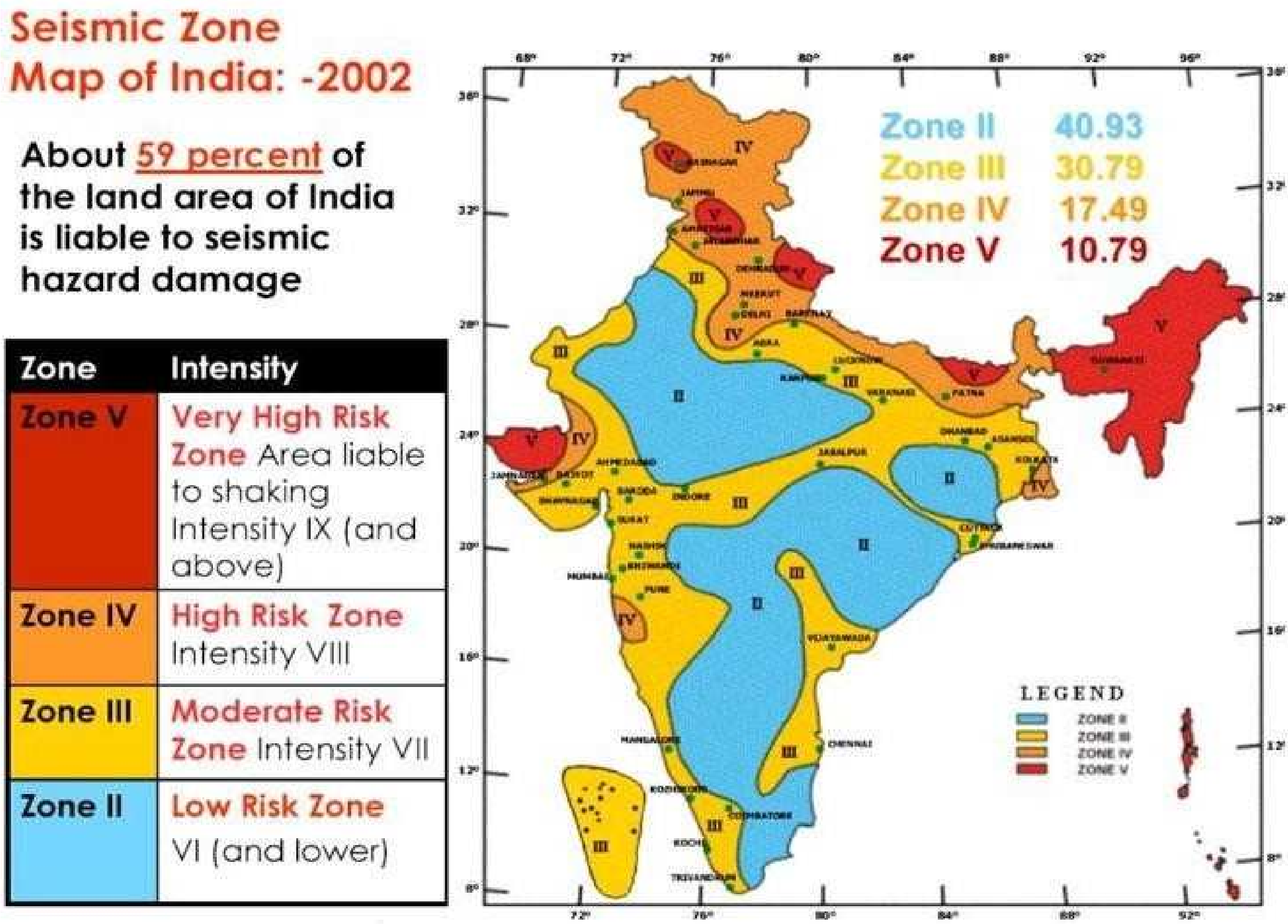


Fig. 1.3 - Map of India showing seismic zones

2. LITERATURE REVIEW

2.1. GENERAL

Current literature survey includes earthquake response of multi storey building frames with usual columns. Some of the literatures emphasized on strengthening of the existing buildings in seismic prone regions.

- **Boumrkik A. (2005)** contemplated trial weakling investigation was completed with an examination the execution of encircled structures under future expected seismic tremors. Slanting ground are think about the three confined structures with 5, 8 and 12 stories separately were dissected. The outcomes acquired in these three structures and think about the pivotal power, bowing minute, nodal relocation, base shear and demonstrates that appropriately The outcomes acquired as far as interest, limit and plastic pivots gave an understanding into the genuine conduct of structures. The conduct of legitimately nitty gritty fortified solid edge building is satisfactory as demonstrated by the crossing point of the interest and limit bends and the circulation of pivots in the bars and the segments. The greater part of the pivots created in the bars and few in the sections yet with limited damage.
- **Shahrin R. &Hossain T.R. (2006)** has reviewed the execution of exposed, full in filled and delicate ground story and slant with 10o, 20o, 30obuildings which isarranged in Dhaka city. The building models have been planned by BNBC (2006) and their execution based seismic examination is evaluated by weakling investigation. The execution of the structures is evaluated according to the system recommended in ATC 40 and FEMA 273. For various stacking conditions taking after the down to earth arrangements of Dhaka city, the exhibitions of these structures are broke down with the assistance of limit bend, limit range, diversion, float and seismic execution level. For the uncovered edge structure they kept standard all through its tallness and cove length to focus on the impacts caused by the dispersion of infill. The structure is six stories high with a story tallness of 3.5 meters. Keeping in mind the end goal to explore the impact of infill dispersion they have considered 3 geometrical cases: The principal case includes a completely in filled structure looking like the customary structures speaking to a consistent appropriation of solidness all through the stature. Second case inspected the impacts of discarding in fills from ground floor just, and contrasts with the diverse incline points, for example, with scandalous delicate ground story arrangement. It has been inferred that the

execution of an in filled outlineis observed to be vastly improved than an uncovered edges structure and furthermore the thought of impact of infill prompts critical change in the capacity.

- **Sadasiva et al. (2008)** evaluated the effect of location of vertical mass irregularity on seismic response sof the structure. A 9 storey regular and irregular (with vertical irregularity) frame was analyzed and designed as per New Zealand code of practice intwo ways. Firstly, it was designed to have maximum interstorey drift at all levels (represented as CDCSIR). Secondly, it was designed to have a constant stiffness (represented by CS) at all levels. To make clear distinction between regular and irregular structure, a special notation form was used by the authors of form NS-M-L- (A), where N- no.of storeys, S-Shear beam, M- Type of model [i.e. S(Shear beam) or SFB (Shear Flexure beam), (A) – Mass ratio].The deformation was represented in the form of graphs. For the study Los Angeles earthquake records had been used and inelastic time history analysis of the structure was performed using Ruamoko software. Based on this analysis it was concluded that in case of both CS and CISDR model the interstorey drift produced is maximum when mass irregularity is present at topmost storey and irregularity increases the interstorey drift of the structure. However, this magnitude varied for both CS and CISDR type of models.
- **Dinh Van Thuat (2011)** determined the storey strength demands of irregular buildings under strong earthquakes. The strength irregularity in the building models was introduced in terms of storey strength factor which represents the relative reserve strength of the storey against failure. A large number of analysis of building models ranging from 7 storeys to 19 storeys were conducted. The analysis results indicate the variation in seismic demands due to introduction of
- **Niroomandi, Maheri, Maheri&Mahini** (2011) retrofitted an eight-storey frame strengthened previously with a steel bracing system with web-bonded CFRP. Comparing the seismic performance of the FRP retrofitted frame at joints with that of the steel X-braced retrofitting method, it was concluded that both retrofitting schemes have comparable abilities to increase the ductility reduction factor and the over- strength factor; the former comparing better on ductility and the latter on over-strength. The steel bracing of the RC frame can be beneficial if a substantial increase in the stiffness and the lateral load resisting capacity is required. Similarly, FRP retrofitting at joints can be used in conjunction with FRP retrofitting of beams and columns to attain the desired increases.
- **Chittiprolu et al. (2014)** the usefulness of shear walls in the structural planning of multistory buildings has long been recognized. When walls are situated in advantageous positions in a building, they can be very efficient in resisting lateral loads originating from wind or earthquakes. Reinforced concrete framed buildings areadequate for resisting both vertical and horizontal loads acting on them. Extensive research has been done in the design and analysis of shear wall highrise buildings. However, significance of shear wall in highrise irregular structures is not muchdiscussed in literature. A study on an irregular highrise building with shear wall and without shear wall was studied to understand the lateral loads, story drifts and torsion effects. From the results it is inferred that shear walls are more resistant to lateral loads in an irregular structure.
- **Pandey et al. (2017)** Shear walls are structural elements especially important in high rise buildings subjected to lateral wind and seismic forces. They provide adequate strength and stiffness to the whole lateral displacement. And can be external walls or internal walls around lift shafts & stairwells or sometimes both are provided. The shape and plan position of the shear wall influences the behaviour of the structure considerably. Shear walls are generally constructed from reinforced concrete, plywood/timber, unreinforced masonry. In this paper we have aimed to study the various research works done for improving the performance of shear wall and locating its best position in a building. Shear walls have proved to be very successful in resisting strong earthquake so far. Keywords: Shear wall, composite shear wall, STAAD Pro, and seismic analysis.
- **Rokanuzzaman et al. (2017)** Shear wall systems are one of the most commonly usedlateral load 49.25ft X 49.25ft with typical floor height of 10ft is considered. In this paper, 8, 10, 12, 14 and 16 storied buildings were modelled using software and three different models were studied with different location of shear wall in building frame for critical parameters like displacement and base shear under lateral loading. The analysis has been carried out using the software resisting systems in high-rise buildings. It is very necessary to determine effective, efficient and ideal location of

shear wall. In this paper focuses to see the effect of shear wall location in multi- storied building. A residential building of G+15(16 Story) structure having base dimension of plan ETABS 9.6.0 and for analysis equivalent static method is used here. Three types of models (one without any shear wall, one with shear wall placed at middle of 4 periphery sides, one with shear wall placed at 4 corners in L shape) have been analyzed. It is found from this study that Model 2 (one with shear wall placed at middle of 4 periphery sides) shows best performance as far as top displacement and base shear are concerned.

- **Mishra et al.(2018)** In the accompanying examination, investigation of 25 storey building in seismic zone V is given sure examinations which have been broke down by changing locations of shear wall for determining parameters like storey drift, base shear, torsion, displacement, storey stiffness and drift index in order to reduce the effect of earthquakes, reinforced concrete shear walls are being used in the building to provide lateral stiffness and stability for the purpose of improving seismic response of buildings. The provision of shear wall in building is to achieve rigidity and had been found effective and economical. Shear walls can be constructed easily and are structural element, efficient both in terms of construction cost and effectiveness in minimizing damages caused by earthquake in structural and non-structural elements (like glass windows and building contents).They are mainly flexural members and usually provided in multi storey buildings to avoid the total collapse of the buildings under seismic forces.
- **P.S. Avinash et al. (2018)** The architectural designer likely tends to provide more space for one or more storey inside the multi-storey building by means of many methods; one of them by using floating columns, which means the end of any verticalelement rest on a beam that leads to discontinuity of columns in such type of multi-storey buildings. So it has been used shear wall in their direction of orientation that provides additional strength and stiffness to the buildings.
- **Prakash et al.(2018)** In the seismic design of a multi storey building, to ensure the stability against the lateral force caused by earth quake various methods are used, the most commonly used method is provision of shear wall to the building. The reinforced concrete shear wall is the most reliable method of construction of shear wall which make the structure resistant against lateral forces, as it imparts stiffness to the structure and provides enough strength which minimises the damages caused by
- the earthquake. In this paper three models are analysed one without shear wall and two with shear wall at different location, one at the corner and one with shear wall at the faces and core of the building through STAAD Pro.
- **Borad et al. (2018)** Open ground story and Floating columns are typical features in the modern multi-storey constructions in urban India. Open ground storey and Floating columns are primarily being adopted to accommodate parking or reception lobbies in the ground storey. Floating columns also provided for the purpose to increase the floor space index. An investigation has been performed to study the behavior of the multi-storey buildings with soft storey and floating columns subjected to earthquake loading. The structural action of masonry infill panels of upper floors has also been taken into account by modelling them as diagonal struts. Shear wall is one of the most commonly used lateral load resisting system in high rise buildings. In this study, building is modelled with shear wall at different locations considering soft storey and floating columns. Linear and Non-linear dynamic analysis is carried out by using ETABS. The comparison of these models for different parameters like Storey drift, Storey stiffness, Max storey displacement, Modal time period, Base shear is carried.
- **Sasidhar T 2018** In the modern era of construction multi-storied building with floating column plays a major role in Urban India. These floating columns are used mainly for satisfying the space requirement in the structure and to get good architectural view of the building. In the present study, the analysis and design of multistoried building with and without floating columns was done using static analysis. A residential multistoried building consisting of G+5 has been chosen for carrying out project work.
- **Saksheshwari 2019** Commonly, Flat slab buildings are used for the construction because use of flat slab building provides many advantages over conventional beam slab building. The objective of the present work is to compare the behavior of multi- storey commercial buildings having flat slabs with drop and peripheral beams and slab. Present work provides good source information on the parameters base shear, lateral displacement and storey drift. The

analysis is carried out by ETABS V9.7.4 software.

PROBLEM IDENTIFICATION & OBJECTIVES

PROBLEMS IDENTIFICATION

Review of different papers related to the subject was done. Some problems wereidentified such as:-

- In past researches tall structure with floating column structure is not safe for earthquake force.
- No comparative analysis of structures on seismic behavior of tall structural byusing of floating columns with shear panels using conventional slab system.
- Use of only floating columns results in the increase in the bending moment, shearand Steel requirement.
- floating column is advantageous in providing good floor space index but risky andvulnerability of the building increases

PRACRICAL UTILITY

- Maximum Storey Drift, horizontal displacement can be calculated and knownfor which storey it is maximum.
- The safe design of the building can be determined.
- This study may be useful to improved design and construction practice forstructures.

OBJECTIVES

- Modeling, analysis and Design of high rise structure using STAAD PRO V8i Software.
- Present work is comparative study of the behavior of multistory buildings with and without floating columns with Conner shear panels under same loading condition for both buildings. Both buildings are analysis for wind load and seismic loading condition.
- Finite element method is used to solve the dynamic governing equation.
- To analyze these models condition in varying dead load, live load, seismic load and wind load and investigate the effect on structural displacement under seismic loading & Wind pressure.
- To study maximum nodal displacement, shear force, storey drift, maximum beam and axial moments generated in beams and columns with and without over floating column system.

3. CONCLUSIONS & FUTURE SCOPE OF WORK

CONCLUSIONS

From the above study following conclusions can be made:

- No. of columns are less in floating column building as comparison to tall building without using floating column
- In this study we concluded that with increase in ground floor column the maximum displacement; inter storey drift values are reducing.
- The base shear and overturning moment vary with the change in column dimension.
- The vertical load and moment are more in columns supporting the shear wall. Hence there are need to increase the sizes of these columns.
- Hence there are more chances of settlement of these columns carrying heavy load or need to greater strength in footing.
- Shear wall provide large stiffness to the building in there placed direction, it reduces damage and sway effect on building.
- Shear wall resists horizontal shear force occurs by seismic load and wind load. And hence it provides extra stability to the building.

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